11.4.0 Brownian Motion (Wiener Process)

Brownian motion is another widely-used random process. It has been used in engineering, finance, and physical sciences. It is a Gaussian random process and it has been used to model motion of particles suspended in a fluid, percentage changes in the stock prices, integrated white noise, etc. Figure 11.29 shows a sample path of Brownain motion.

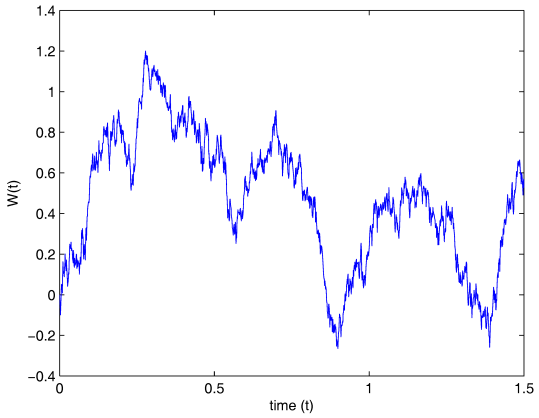

Figure 11.29 - A possible realization of Brownian motion.

In this section, we provide a very brief introduction to Brownian motion. It is worth noting that in order to have a deep understanding of Brownian motion, one needs to understand $It\bar{o}$ *calculus*, a topic that is beyond the scope of this book. A good place to start learning $It\bar{o}$ calculus is [25].

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